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Opening the Door a Crack

American Cryptology During the Korean War

Thomas R. Johnson

Editor's Note: The Korean peninsula was divided at the 38th parallel as part of war settlements decided at the Potsdam Conference in July 1945. Less than five years later, on 25 June 1950, North Korean forces invaded South Korea. In response to a United Nations (UN) call for troops to restore peace, the United States committed ground, air, and naval forces to the conflict before the end of June. Pushing northward, UN forces reached the China border on 20 November, triggering a Chinese assault across the Yalu river into Korea. Fighting eventually stalemated near the original border between the two Koreas. An armistice, signed on 27 July 1953, provided for the continued presence of US troops on Korean soil. The United States suffered more than 140,000 casualties during the engagement. A peace treaty has never been signed.

Corrected map from classified volume American Cryptology During the Cold War, 1945-1989, Book I, (Ft. Meade: National Security Agency, 1995)

Allied silence about the role of cryptology in World War II was broken in 1974 by the publication of Frederick Winterbotham's *The Ultra Secret.*1 The world had waited almost 30 years for the beginning of a declassification program for World War II communications intelligence (COMINT). A few spare historical accounts written during and immediately after the war represented most of what the National Security Agency (NSA) and the UK Government Communications Headquarters (GCHQ) had been willing to divulge, until, at last, enough pressure was mounted for a more general declassification effort. Larger and larger volumes of World War II documents emerged into public view, until by the end of the century virtually no bars remained to a complete release.

With Korean war cryptology, we are still in the early stage of declassification fifty years after the outbreak of the war. NSA has recently declassified a few historical summaries, but has not yet begun to release any reports from the war itself.2 So what do we know about cryptology in Korea? Some of our knowledge preceded the official declassification effort. When Clay Blair wrote his history of the Korean war in the 1980s, he incorporated some tantalizing bits and pieces about the role of exploited North Korean messages, especially as it related to the Pusan

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perimeter.3 More recently, researcher Matthew Aid has ferreted out a larger part of the story.4 When we put what they have published together with the accounts recently released by NSA, we can assess what we know and, by implication, what we do not yet know.

Postwar Letdown

Korea can best be understood in terms of World War II, which has been described as a "SIGINT [signals intelligence] War."5 By the end of the war, the Americans and British, with help from the Canadians and Australians, were able to read most of the important cryptographic systems that the Axis nations employed. Harry Hinsely, the British intelligence historian and direct participant in matters cryptologic, has written that the war was probably shortened by six months as a result of SIGINT successes. I would put the number at four to six months. Even if it were only four months, try running the numbers on likely additional Allied casualties over that period. Or, looking at the issue in another way, if the Russian troops were on the Elbe in May 1945, how far west might they have moved by September?

Among the generals and admirals who benefited from COMINT, expectations rose. Not knowing or understanding the black arts by which these things were done, they believed that the codebreakers could do anything they set their minds to and that their successes would continue into the trackless future.

Within years of the end of World War II, however, American cryptology was a hollow shell of its former self. When the soldiers and sailors went home in 1945, so did the cryptologists. Permanently lost to cryptology were (b)(6) (b)(6) as well as mathematicians (b)(6) and a host of others. And this was just on the American side. The British lost, among others, (b)(6) (b)(6) credited by some as the inventor of the modern digital computer. The loss of talent was accompanied by a catastrophic budgetary collapse.

The lack of resources was compounded by bureaucratic infighting. A wartime feud between Army and Navy cryptologists continued into the post-war period. Then a new group--the Air Force Security Service (USAFSS), established on 20 October 1948--joined the fray. Although the USAFSS began as a weak sister, it benefited from the Air Force's ability to get money from Congress and soon became the largest of the three service cryptologic agencies. It also became the most parochial, separating itself from the cryptologic community by physical as well as psychic distance by setting up its headquarters in San Antonio, Texas.

Amid all the bickering came signs of professional failure. Until 1948, the Army and Navy had been reading many of the codes of the new prime target, the Soviet Union. Then, in the space of less than a year, the lights went out. The USSR changed everything--its codes and ciphers, its communications procedures, and the very equipment that it used. The cryptologic community referred to what had happened as Black Friday. In fact, it didn't happen on a Friday, but evolved over several months. The bottom line was the same: the cornucopia of exploitable messages disappeared and Washington was caught short.

Woe piled upon woe. In 1949, Chiang Kai-shek fled to Taiwan, and Mao and the Communists came to power on mainland China. Their communications were no more exploitable than those of the Soviet Union.

In 1949, the feuding cryptologic agencies attempted a union of sorts, called the Armed Forces Security Agency (AFSA). AFSA, however, lacked the authority to control its nominal subordinates. Instead of one umbrella agency overseeing three military service departments, four more-or-less coequal organizations competed for resources in a shrinking pool. Moreover, as a creation of the Joint Chiefs of Staff (JCS), AFSA gave priority to military requirements, resulting in bitter complaints from civilian customers, especially the CIA and the State Department. At AFSA's founding, the United States was already unable to exploit the communications of its two principal antagonists and it was just months short of its next major war.

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Wake Up Call in Korea

When it came to COMINT on Korea, AFSA had no arrows in its quiver. Like the rest of the Intelligence Community, it had only the most tenuous and insubstantial requirements to work with--keeping a general eye on the Soviet posture on the peninsula and little else. No one in the US Government seemed worried about Korea, and AFSA, preoccupied with jurisdictional disputes, gave it little attention. It had plenty of other work to keep it busy. Even worse, AFSA had no technical expertise on Korea. It had only one self-taught Korean linguist, no Korean dictionaries, no Korean typewriters, and no books on Korea. Until April 1950, it had no Korean communications collection of any kind. As it happened, late in 1949 one of its units in the Far East had collected some traffic that looked like Soviet communications, but, when finally analyzed months later, turned out to be Korean. On 21 April 1950, AFSA tasked an Army Security Agency (ASA) unit near Kyoto, Japan, to collect more Korean traffic. By mid-June, however, Kyoto had collected virtually nothing.

Following World War II, Korea had been left outside the American defensive perimeter in the Far East. When the North Koreans invaded the South in June 1950, they met little opposition. Republic of Korea (ROK) armed forces numbered barely 100,000 poorly armed and inadequately trained infantry troops against a North Korean army of about 135,000 fully trained soldiers with tanks and artillery. The United States had only a 500-man Korean Military Aid Group on the peninsula--it was designed to show the flag, not defend the country. The US contingency plan for Korea was to evacuate posthaste to Japan.

After initial hesitation, the United States responded to the UN call for troops and entered the fray. President Truman ordered Gen. Douglas MacArthur in Japan to scrape together a defensive force and send it to Korea. American forces began arriving at the South Korean port of Pusan in late June, and Gen. Walton Walker, commander of the US 8th Army, hastily assembled American forces and remnants of the ROK Army to try to hold a line.

ASA, the Army's cryptologic organization, was caught just as flat-footed as everyone else. Initially, Walker had little or no SIGINT support. The first ASA contingent did not arrive until 9 September, six days before the US landing behind enemy lines at Inchon. This contingent was an advance unit from Hawaii, with minimal capability. ASA's plan was to support 8th Army with one communications reconnaissance battalion at Army level, and a battalion assigned to each of the three subordinate corps; however, it took the first designated Army SIGINT unit--the 60th Signal Service Company at Fort Lewis, Washington--three and a half months to arrive on the scene.

Filling the Breach

The Air Force actually beat ASA to Korea. Its first representative, [(b)(6)], arrived in Taegu on 19 July 1950, almost two months ahead of his Army counterparts. Using equipment borrowed from the USAFSS unit in Tokyo, he attempted to set up a tactical SIGINT organization to support the 5th Air Force. (b)(6) however, found that the 5th Air Force already had SIGINT support, courtesy of one (b)(6) A murky figure, (b)(6) lived in Seoul, had a reserve commission as an Air Force major, and headed the local Office of Special Investigations. Quite on his own, he had set up a hip-pocket SIGINT intercept and reporting service using native Koreans. The most prominent of these were (b)(6) a former North Korean Army radio operator and cryptanalyst, and (b)(6) , a captain in the ROK nav (b)(6) had served with the Japanese SIGINT service in world war II and, having been interned in Hawaii for a period of time, had a good grasp of English. Together, they had a going concern. (b)(6) , in turn, reported the material as thinly disguised HUMINT. The 5th Air Force didn't want (b)(6) After taking possession of his badly needed equipment, they sent him back to Japan.

This development did not accord with either the plans of MacArthur's intelligence chief (G2) or

US cryptologic doctrine. (b)(6) was sent back to Korea twice, finally managing to set up a direct support organization. In November, he repossessed his equipment and incorporated the unit established t(b)(6) for language support. By this time (b)(6) had had a falling out, and (b)(6) had hooked up with ASA to provide language support, while(b)(6) remained with (b)(6) and the Air Force. With the appearance of a full-fledged USAFSS direct support unit, (b)(6) seems to have disappeared from the cryptologic scene.

Although the service cryptologic agencies were not yet on duty in Korea, AFSA was already hard at work on the problem. Within a few days of the North Korean invasion, AFSA analysts were working 24 hours a day. As many collection positions as could be spared from Soviet and Chinese intercept duty were diverted to Korean coverage--initially twelve positions, all located in Japan.

In those early days, North Korean communications were rudimentary and exploitable, and AFSA set about to attack them. After three weeks of work, AFSA had its first breakthrough against North Korean communications on 14 July, followed by a string of additional successes. The 16-31 July issue of the AFSA Semi-Monthly Report noted that North Korean communications matters were much improved.

The SIGINT improvements came just in time for Gen. Walker's defense of the Pusan perimeter. Walker established his defensive perimeter on 31 July, as the last US troops fled across the Naktong river near Taegu, north of Pusan. With interior lines but inferior forces, Walker frantically shuttled his troops to points of North Korean attack. He was able to hold the line largely due to knowing where the North Koreans were going to attack, information coming primarily from SIGINT reports. From 31 July until the Inchon invasion in September relieved the pressure by North Korean forces, Walker continued to juggle his forces using information from North Korean messages. It was a classic illustration of the adage that intelligence is appreciated primarily by the defensive side.

The highlight of this early phase of the struggle was an offensive near (b)(6) headquarters at Taegu on 31 August. An AFSA report based on exploited North Korean messages contained much of the North Korean battle plan. We know little about how (b)(6) got this support. ASA's units had not yet arrived and there appears to have been no mechanism for (b)(6) to receive AFSA reports; the general may have been relying on ROK intelligence from the (b)(6) unit. In any event, the information reached (b)(6) two days before the attack, permitting him to shift his forces in time.

Predicting China's Intervention

The 8th Army rolled north after the 15 September landing of US forces at Inchon. By the end of the month, American and ROK troops stood poised at the 38th parallel. Syngman Rhee, the committed anti-Communist who headed South Korea's government, scarcely hesitated before ordering his troops across the postwar divide into North Korea. MacArthur, too, gave a green light, and the US Army steamed into the north.

The US objective was the Yalu river, which marked the Korean border with Manchuria. The JCS considered this risky in view of possible Chinese intervention in the war and questioned MacArthur closely. President Truman was so concerned that he flew to Wake Island to discuss the military situation with MacArthur in mid-October. The general contended that there was nothing to worry about from the Chinese.

All the time, however, AFSA had been publishing reports pointing to probable Chinese intervention. The great bulk of the information came from Chinese civil communications, which carried large volumes of routine logistics and movement orders for Chinese military units. As early as July, AFSA had began noting references to army units moving north. Rail hubs in central China were jammed with soldiers on their way to Manchuria. By September, AFSA had identified six of the nine field armies that were later involved in the fighting in North Korea and had located them in Manchuria, near the Korean border. Ferries at Anshan (on the Yalu river) were being

reserved for military use. Maps of Korea were being ordered in quantities large enough to equip 30 divisions. On 7 November, in a radiotelephone conversation intercepted and published by AFSA, an East European ambassador in Beijing stated, "We are already at war here."

This was not news to the ROK Army. On 25 October, a ROK division had been badly mauled by elements of the Chinese 40th Army. earlier reported by AFSA to be close to Korea. Five days later, MacArthur's chief of staff, (b)(6) reported that he had seen Chinese prisoners being held by a ROK unit. On 1 November, a Chinese force attacked a US unit for the first time. But (b)(6) , MacArthur's G2, preferred to believe that these encounters represented isolated Chinese volunteers rather than division-strength regular Chinese Army units.

Throughout the fall of the year, there was great uneasiness in Washington about what the Chinese would do. Intelligence agencies started to pay closer attention. The Watch Committee of the Joint Intelligence Committee, which began noting Chinese troop movements as early as June, concluded by September (partly on the basis of AFSA reporting) that these troops were moving north rather than to the coastal provinces near Taiwan. By mid-October, however, the Watch Committee had changed its opinion, saying that, although there was convincing evidence that startling numbers of Chinese forces were in Manchuria, the time for intervention had passed. They concluded that the Chinese would not intervene. This judgment was not supported by COMINT. Encounters with Chinese ground and air forces in late October and early November eventually caused the Watch Committee to take another look.

Ignoring the SIGINT reports on Chinese troop movements was one of the most famous miscalculations in modern American military history. MacArthur was determined to press ahead with offensive operations to reach the Yalu and get the boys home by Christmas. On the snapping cold night of 25 November, thousands of Chinese soldiers fell on unsuspecting units of the 8th Army. The American offensive quickly turned into a defensive, and the defensive into a rout, with high casualties. Both Army and Air Force SIGINT units tarried too long and were nearly overrun before escaping to the south.
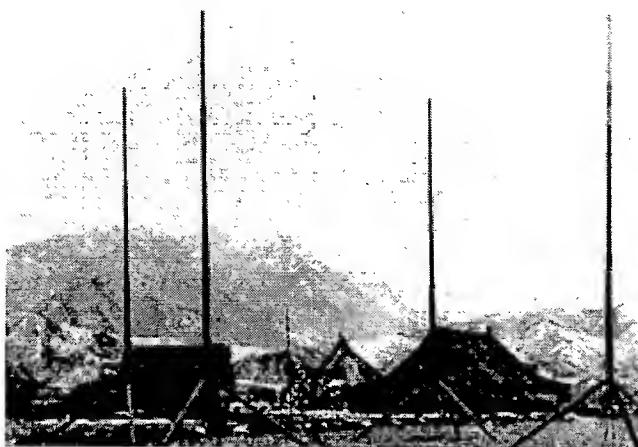
The Marines apparently had no SIGINT support throughout the war, at least at the tactical level. The most infamous incident was the retreat of the 1st Marine Division, which had been trapped at the Chosen reservoir in northeast Korea. A Marine radio company, trained for COMINT support, was at Camp Pendleton in California, but did not deploy to Korea because it lacked the necessary equipment and was not considered combat ready. The system of tactical intercept support to Marine units that had been established so laboriously in World War II had almost disappeared. It took the entire Korean war to reestablish a semblance of what had been available earlier.

SIGINT Challenges

As the situation settled into grim trench warfare in central Korea, the SIGINT organizations tried to shore up their capabilities. The most pressing problem was to find enough linguists. The requirement to translate three different languages severely stretched cryptologic resources throughout the war.

- ASA had only two Korean linguists- (b)(6) -and both were assigned to the language school in Monterrey. The choice was to leave them in California to train future Korean linguists or transfer them to the front. Both found themselves with tickets to Korea. Two linguists would hardly suffice, however. ASA acquired a translating service of its own, the so-call(b)(6) unit, named after th(b)(6) of the earlier (b)(6) uni(b)(6) and his unit hooked up with USAFSS and provided stellar translating service throughout the war.

- Another critical need was for Chinese linguists. The SIGINT services partially solved the problem by hiring Nationalist Chinese officers from Taiwan. This process was slow, however.

- Finally, there was the Russian problem. Russian air forces had established a communications net in China to serve military and civilian aircraft at airfields in Korea and Manchuria by July 1950. Early the following year, COMINT intercepts showed Soviet control of fighter activity in the northernmost regions of Korea, and Soviet pilots were noted frequently in air-to-air and air-to-ground conversations.

Army Security Agency Direction Finding Unit in the Mountains of Korea. (NSA photo)

Before the Chinese intervention, the Air Force had dreamed of setting up a cryptologic outpost in Sinanju, far to the north, for North Korean communications, with a rear detachment in Pyongyang to intercept Soviet and Chinese messages related to the war. As UN troops fled south in December 1950, even Pyongyang was out of the question, and the Air Force eventually set up its operations in Pyongtaek, well south of the 38th parallel. Here the Air Force attempted, with limited success, to support American ground controllers with SIGINT.

Once the UN forces had regained the initiative, Seoul was safe, and both Air Force and Army cryptologists moved their headquarters to the western suburbs of Seoul--the Air Force to Chosen Christian College and the Army to the campus of Ewha College. ASA units were flung along the wavering front north of Seoul. They were organized into small tactical support units, mostly with manual Morse positions. Morse communications proved difficult to exploit and were of little value in the tactical environment. ASA analysts did apply traffic analysis, however, to establish an order of battle for the North Korean army.

Most of ASA's value in Korea stemmed from its intercept of Chinese and Korean voice communications. Much of that came from the detection of Chinese telephone conversations being carried through the ground and picked up by sensors originally designed to detect the tramp of advancing enemy troops. (Such ground-wave intercept techniques had been pioneered during World War I.) This serendipitous discovery resulted in the formation of low-level voice intercept (LLVI) units. Later, ASA units also intercepted Korean voice communications, and many of the LLVI teams wound up having to provide translations in two languages. The program was limited only by the availability of good linguists. By war's end, there were 22 LLVI teams in Korea, a testament to success.

Success Stories

The dull trench warfare was occasionally punctuated by fierce battles where SIGINT played a crucial role. One such encounter, an attempt by the Chinese Communist troops to take Hill 395 in central Korea in 1952, came to be known as the "Battle of White Horse Mountain." Intercepted Chinese communications gave the Americans warning of the attack. ASA rushed an intercept unit to the spot, and it fed American commanders with hard intelligence as the battle progressed. The Chinese lost 10,000 troops out of the 23,000 they had committed. In March 1953, COMINT also tipped off Chinese planning for offensives at Old Baldy and Pork Chop Hill.

Air Force SIGINT operations benefited from Soviet air warfare doctrine, which called for fighter aircraft to be closely managed by ground controllers who were watching the battle on radar. USAFSS discovered Russian voice communications in the early spring of 1951, and set up a mobile intercept hut at Pyongtaek in central Korea. As they listened to the Soviet pilots talking to the ground controllers in North Korea, their biggest concern was security. No one on the operations side was cleared for the information, so they had to disguise it as American radar plots.

They would call the information over a landline connected to the operations building. The American Air Force controller could then pass the information on to the pilots, mixing it with radar plots. On no occasion was anyone in USAFSS ever permitted to take the next obvious step and talk directly to the pilots in the air.

The SIGINT warning operation significantly expanded the range of coverage beyond American radars, and many believe that it was partly responsible for the enormous American kill ratio in the air war. As the front lines moved farther north, the USAFSS operation was transferred to Kimpo airport to remain collocated with the Tactical Air Control Center (TACC), which controlled the air war. In August 1951, the TACC and its Security Service unit moved again, to Pyong-Yong-Do (referred to by the GIs as P-Y-Do), a small island in the East China Sea north of the 38th parallel. Here they continued the warning operation, called Yoke, in tandem with the TACC. The P-Y-Do operation was closed down a month later and USAFSS returned to Seoul. All Air Force SIGINT warning was collocated at Chosen Christian College, where analysts had available, for the first time in one geographic location, intercepts of North Korean, Chinese, and Soviet communications, both Morse and voice.

The VHF Complication

This idyllic situation began to change almost as soon as it began--the target refused to remain static. Intercepts of tactical air voice communications began drying up. Air Force analysts suspected that the enemy was starting to use very high frequency (VHF) ranges for transmission. VHF can only be intercepted at locations within the line of sight of the transmitter. Suburban Seoul was just too far away.

VHF usage had first appeared during World War II, but had been in its infancy. In the five years following the end of the war, the world's military organizations had continued to use high frequency (HF) for communications. Use of frequencies above HF was still experimental. When USAFSS operators in Korea could no longer hear enemy pilots, however, they concluded that the reason had to be a change in transmission frequency.

(b)(6)

This adverse development coincided with the arrival of (b)(6) with the first batch of school-trained American Chinese linguists in mid-195? (b)(6) took stock of the situation. The voice communications that he and his people were trained to intercept were no longer hearable. Meanwhile, the TACC had moved from Kimpo to Cho-Do Island, off the east coast of Korea near the North Korean port of Wonson. Tactical SIGINT support now involved the laborious process of intercepting at Chosen and relaying to Kimpo, with a further relay to the TACC at Cho-Do. The answer? Move the USAFSS intercept operation to Cho-Do.

Tests on Cho-Do in August confirmed that enemy pilots were now using VHF for communications and that those communications were hearable from the island. (b)(6) and the USAFSS contingent headed for Cho-Do. They set up intercept operations about three-quarters of a mile from the TACC, an (b)(6) placed a linguist in the TACC next to the tactical air controller. He had a field phone sitting on his desk, with the other end at the USAFSS intercept unit. Combined with the improved ability to hear, the new lash-up at Cho-Do Island provided the best support that USAFSS mustered during the entire war. In one day, which (b)(6) described as the "great Korean turkey shoot," American F-86s downed fifteen MiGs without a loss, even though none of the MiGs was ever seen on American radar. The information came, of course, from the COMINT operation on Cho-Do. A visiting ASA colonel commented that "it was just like shooting ducks in a rain barrel."

Back in Washington

Meanwhile, AFSA was having a hard time of it. North Korean communications, so exploitable earlier in the war, dried up in the summer of 1951. The North Koreans adopted Soviet communications procedures, and the communications nets that AFSA had been exploiting earlier no longer yielded useful intelligence. This development made Korean war SIGINT mostly a tactical problem--there was little strategic information available from AFSA in Washington.

At the same time, AFSA was losing the bureaucratic struggle to centralize American cryptology. The three service cryptologic organizations went their own way, ignoring or defying AFSA orders. AFSA, for example, had established a rule that it would control all resources that resided at "fixed" field sites, while the services would control those that were "mobile." At the time, virtually all sites (except those with tactical Army units in Korea) were regarded as "fixed." USAFSS simply reversed "fixed" and "mobile." An Air Force general commented wryly that the sites were "about as mobile as the Eiffel Tower." With the stroke of a pen, however, the Air Force had removed its collection resources from AFSA control.

With AFSA powerless to intervene in jurisdictional fights, a nasty row broke out between ASA and USAFSS about which one would target air-related communications. The result was that both of them targeted the same communications, while leaving other targets unattended. This approach not only wasted resources, but also violated the sense of decorum that should have prevailed within the Intelligence Community. It had become an all-out food fight.

The Korean war spelled the demise of AFSA. American officers who had considered readable high-level enemy communications almost a birthright during World War II voiced their unhappiness at the turn of events. Two important customers, the CIA and the State Department, viewed AFSA's organizational problems with alarm. Fragmented control and duplicated resources, they believed, were resulting in the JCS squeezing CIA and State SIGINT requirements out of the picture in favor of straight-out military targets. To them, it was all part of a palpable decline in the effectiveness of American SIGINT.

In December 1951, Walter Bedell Smith, the crusty Director of Central Intelligence, wrote a memorandum to the National Security Council, recommending that a committee be established to "survey" American COMINT. The NSC forwarded the letter to President Truman. The events that ended the life of AFSA and led to the establishment of the National Security Agency began to unfold.

In Conclusion

From what we can now glimpse, the bottom line on SIGINT in the Korean war paralleled the overall American experience during that war. There were successes and there were failures, but the failures tended to overshadow the successes. The war ended in a draw, a highly discomfiting outcome for the American public, the generals and admirals who led the fight, and the men and women who fought it.

SIGINT, too, ended in a draw. What tactical successes there were, were gained only after long delay and prodigious effort. Unready for Korea, American cryptologists rose unsteadily to the challenge and were knocked down several times by enemy haymakers. Resources were inadequate, organization was sometimes chaotic, and expertise had to be acquired laboriously. Still, SIGINT did make a difference on a number of occasions. It was not quite what had been achieved in World War II, but it did establish the outlines of a successful tactical SIGINT support system.

The real tragedy of Korea was that the lessons learned "the hard way," through battlefield experience, were promptly forgotten. They had to be re-learned in Vietnam a decade later. The Army was no more ready for tactical SIGINT support in Vietnam than it had been in Korea. (b)(6) had to be sent to Saigon to show the Air Force how to do tactical warning. But that is a story for a future article.

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Footnotes:

1 Frederick W. Winterbotham, *The Ultra Secret* (New York: Harper and Row, 1974).

2 As of July 2001, NSA's website (www.nsa.gov) listed five papers related to Korea: Jill Frahm, "So Power Can be Brought into Play: SIGINT and the Pusan Perimeter;" David A. Hatch and Robert L. Benson, "The Korean War: The SIGINT Background;" Thomas R. Johnson, "General Essay on the Korean War," originally published in *American Cryptology During the Cold War, 1945-1989, Book I: The Struggle for Centralization, 1945-1960* (Fort Meade: NSA, 1995), pp. 36-56; Patrick D. Weadon, "SIGINT and COMSEC Help Save the Day at Pusan;" and "Cryptologic Background to the Chinese Intervention," by an anonymous retired NSA officer.

3 Clay Blair, *The Forgotten War: America in Korea, 1950-1953* (New York: New York Times Books, 1987).

4 Matthew M. Aid, "U.S. Humint and Comint in the Korean War: From the Approach of War to the Chinese Intervention," *Intelligence and National Security,* Vol. 14, No. 4, Winter 1999.

5 Walter Laqueur, *A World of Secrets: The Uses and Limits of Intelligence* (New York: Basic Books, 1985).

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